

LAS VEGAS FIRE & RESCUE

UNIFORM GUIDELINE for SMOKE CONTROL TESTING & RECERTIFICATION

(These guidelines are based upon a consensus document developed by the Southern Nevada Fire Chief's Association, Fire Code Committee)

TITLE: **Inspection & Periodic Testing of Existing Smoke Control Systems**

REFERENCE (S): **NFPA 1, Uniform Fire Code, 2003 Edition as amended**

11.8.5 Unless otherwise authorized or required by the chief, all smoke control systems shall be inspected and tested as required in accordance with the City of Las Vegas, Fire & Rescue's guidelines on "Smoke Control System Testing & Recertification". Approved persons shall conduct tests and a written record of testing shall be maintained and shall be made available to the Las Vegas Fire & Rescue upon request.

11.8.6 All smoke control systems shall be inspected and tested in the presence of the Las Vegas Fire & Rescue for initial certification, before being placed into service.

NFPA 92A, 2002 Edition

2.1.2 Dedicated and Nondedicated Systems.

2.1.2.1 Dedicated Systems.

Dedicated smoke-control systems are installed for the sole purpose of providing smoke control. They are separate systems of air moving and distribution equipment that do not function under normal building operating conditions. Upon activation, these systems operate specifically to perform the smoke-control function.

2.1.2.2 Nondedicated Systems.

Nondedicated systems are those that share components with some other system(s) such as the building HVAC system. Activation causes the system to change its mode of operation in order to achieve the smoke-control objectives.

SCOPE: To identify the responsibilities of the Las Vegas Fire & Rescue, Special Inspector and Owner.

To provide details regarding who is qualified to perform the periodic testing of smoke control systems with the intended result being the issuance of a re-certification of the system by the special inspector.

To specify what components are required to be tested and how

often they shall be tested.

**TESTING
FREQUENCY:**

Dedicated systems shall be tested on a semi-annual basis

Non-Dedicated systems shall be tested on an annual basis

PURPOSE:

To maintain the minimum level of life safety and property protection originally designed into the building. By verifying through inspections and testing that the existing smoke control system(s) continue to operate in accordance with the approved design.

To standardize the procedures describing the testing of existing smoke control systems and to provide a standard guideline for qualified special inspectors to utilize when testing these systems.

DEFINITIONS:

SPECIAL INSPECTOR

An individual approved by the Las Vegas Fire & Rescue to inspect smoke control systems, OR a company employing an individual meeting the criteria specified herein. Nothing in this definition is intended to prevent a Level 1 or 2 Inspector from supervising the work of an employee.

The Las Vegas Fire & Rescue will maintain a list of approved individuals.

Two levels of approval are available:

- A Level 1 inspector is not limited in the level of service they can provide.
- A Level 2 inspector is limited to those areas as defined in this guideline.

SMOKE CONTROL REPORT

This report is the controlling document for the smoke control system. A smoke control report consists of an executive summary, list of documents reviewed, passing criteria, testing scenarios, inspection and testing documentation and a Certificate of Compliance. The report shall be typed and bound.

CERTIFICATE OF COMPLIANCE

A certificate that is provided by the special inspector certifying that the referenced property is in substantial compliance. The certificate shall identify the company and special inspector that performed the testing, name, date and address of the property being tested. Plus the following statement:

I have reviewed this report and by personal knowledge and on-site observation certify that the smoke control system is in substantial compliance with the approved design documents, and to the best of my understanding complies with requirements of the applicable codes as identified in the smoke control report.

RULES AND REGULATIONS:

GENERAL

After the owner determines that their property contains a smoke control system the following steps need to occur.

- 1) The owner shall contract with an approved special inspector to perform the recertification of the system
 - a) The initial recertification shall be done by a Level – 1 special inspector
 - b) The level of special inspector needed for subsequent recertifications depends upon the type of smoke control system installed
- 2) The special inspector prepares the preliminary report and submits it to the Las Vegas Fire & Rescue for review and approval
- 3) Within 90 days of preliminary report approval the testing shall be completed and a final report submitted to the Las Vegas Fire & Rescue for review and approval

SPECIAL INSPECTOR LEVELS

Each applicant shall submit a written request for approval to the Las Vegas Fire & Rescue and stipulate the level(s) being requested.

General Requirements– All requests shall contain the following:

- Curriculum vitae
- Copy of business license
- Sample test and inspection report

Level 1 – A special inspector that is qualified to recertify or test any smoke control system. Examples include buildings containing: systems that have extensive interfaces with fire alarm, security and building automation systems or widespread usage of fire assemblies and smoke barriers.

A level 1 special inspector shall be a professional engineer meeting the following requirement and providing the required documentation:

- Copy of Nevada Registration as either a Fire Protection, Mechanical or Electrical Engineer
- Detailed explanation of experience with an engineered smoke control system utilizing a “UBC 905, IBC 909 or equivalent” smoke control system.

Level 2 – A special inspector qualified to inspect designated smoke control equipment. Examples include: buildings with only pressurized stairtowers and/or elevator machine rooms or mechanical smoke exhaust systems installed as alternates to smoke and heat vents.

A level 2 special inspector shall meet the following requirements and provide required documentation:

Registered with either:

- Association of Air Balance Council (AABC), **OR**

• National Environmental Balancing Bureau (NEBB), and
A copy of the individuals current registration as a member in good standing with either of the above mentioned associations, **AND**

Detailed explanation of experience with engineered smoke control equipment or systems.

APPROVAL OF SPECIAL INSPECTOR

The owner and Las Vegas Fire & Rescue shall jointly approve the special inspector. Care shall be taken to ensure that the individual selected has the necessary education, experience and ability to perform the recertification of the smoke control system.

OPERATIONS and MAINTENANCE DOCUMENTATION

All operations and maintenance activities since the last certification shall be documented. By documenting all activities, the recertification of smoke control systems is greatly simplified. If the special inspector can review documentation to determine any changes that have occurred since the previous recertification the costs incurred by the owner for recertification should be dramatically lower.

All changes, corrections, modifications or alterations to the smoke control system shall be approved by the Authorities having Jurisdiction (Fire & Building Departments) and documentation maintained.

SMOKE CONTROL REPORTS

Written reports that include all of the following, as applicable or available.

A preliminary report containing sections 1-4 of the final report requirements, as listed below, shall be submitted for review and receive approval by first the Owner and then the Las Vegas Fire & Rescue prior to the start of testing. Draft preliminary reports may be submitted prior to obtaining original signatures.

Appendix A provides a list of documents to be submitted in the analysis of a smoke control system and in the preparation of both portions of the smoke control report. If the special inspector determines that any document listed in Appendix A will not be used, an explanation describing why, shall be included in

the reports. It is the responsibility of the special inspector to determine what level of documentation is necessary. Either the Owner or Las Vegas Fire & Rescue may require additional documentation.

The final report shall be typed and bound. The report shall consist of the following sections:

1. Executive Summary of smoke control design methodology
2. Documents Reviewed
3. Passing Criteria
4. Testing Scenarios
5. Inspection and Testing Report
6. Certificate of Compliance

A minimum of four originals shall be produced. (Owner, Special Inspector, Las Vegas Fire & Rescue and Fire Command Center)

Subsequent tests should only consist of an addendum to the original recertification report or an original certification report when approved by the Las Vegas Fire & Rescue.

INITIAL RECERTIFICATION FOR ALL SMOKE CONTROL SYSTEMS

- Shall be performed by a Level – 1 special inspector.
- Shall test 100% of the smoke control system.

PRE – 1994 SYSTEMS PERIODIC TESTING

- May be performed by either a Level – 1 or 2 special inspector as determined by the Las Vegas Fire & Rescue.

POST – 1994 SYSTEMS PERIODIC TESTING

UBC 905 or IBC 909 Systems including all Educational and Institutional Occupancies

- Shall be performed by a Level – 1 special inspector
- Shall test at least 20% of the smoke control system as required for dedicated versus non-dedicated systems. Cumulative testing using the 20% option shall result in a 100 percent of the system being tested every 5-years.

Other Post – 1994 Systems

- May be performed by either a Level – 1 or 2 special inspector.
- Shall test at least 50% of the smoke control system annually as required for dedicated versus non-dedicated systems. Cumulative testing using the 50% option shall result in a 100 percent of the system being tested every 2-years.

RECERTIFICATION / TESTING PROCEDURE

1. The Owner or Las Vegas Fire & Rescue identifies a building containing a smoke control system. Examples include:
 - Buildings with Pressurized Stair Enclosures
 - High-rise buildings with Mechanical Smoke Control Systems
 - Mall buildings containing Mechanical Smoke Control Systems
 - Buildings with Atria with Mechanical Smoke Control Systems
 - Buildings with Mechanical Smoke Control Systems in lieu of smoke & heat venting
 - Other buildings with Mechanical Smoke Control Systems such as hospitals and jails

2. Owner contacts the Las Vegas Fire & Rescue to obtain list of pre-approved special inspectors. The Las Vegas Fire & Rescue maintains this list.
3. Owner hires an approved special inspector to write the smoke control report.

If there is no previously approved report, the smoke control report required in this section shall constitute the initial document regarding the design and expectations of the existing smoke control system.

4. A meeting shall be arranged between the owner, Las Vegas Fire & Rescue and special inspector to determine what tests are required. This meeting will

also provide an opportunity for discussion of any unique aspects of the facility.

5. A Preliminary Smoke control report containing the following sections shall be submitted for review and be approved by both the Owner and the Las Vegas Fire & Rescue prior to the commencement of any testing.

- Executive Summary of smoke control design methodology
- Documents Reviewed
- Passing Criteria
- Proposed Testing Scenarios

6. Testing shall be conducted and a final report submitted within 90 days after the preliminary smoke control report is approved. The following is the minimum testing and/or auditing of records that shall be performed in order for a special inspector to issue a certificate of compliance.

A. Testing

- All testing shall be coordinated with the companies holding the maintenance contracts for affected systems. (Fire alarm, sprinkler, HVAC, kitchen hood etc.)
- Verify that devices are properly annunciated at the control panel.
- Verify system function by placing zones into alarm and checking the input and output signals and device functionality against the information contained within the preliminary smoke control report.

B. Records Review

- Verification of location and integrity of smoke zone boundaries to approved documents.
- Review of maintenance records of devices and equipment making up the smoke control system; this is to include as a minimum: initiating devices, fans, dampers, controls, doors and windows if self or automatic closing.
- Verify that the appropriate maintenance requirements are being met by the facility.
- The owner shall document smoke control system testing that is conducted in conjunction with fire alarm system testing.
- Documentation shall be on forms submitted as a part of the preliminary smoke control report.

7. Special Inspectors shall immediately notify the Las Vegas Fire & Rescue in writing whenever it is determined that a smoke control component or system is inoperable and is creating a life-threatening situation.
8. The special inspector upon discovery of any non-complying aspect shall give written notice to the owner if the item is not corrected prior to the special inspector leaving for the day. All non-complying aspects shall be corrected.
9. Special Inspector shall notify the Las Vegas Fire & Rescue of all items not corrected within 30 days from date of discovery
10. Within 30 days of completion of the testing the Final Report shall be submitted, signed by special inspector and owner, to the Las Vegas Fire & Rescue. Any unresolved issues shall be identified in summary form in the initial sections of the report.
11. Las Vegas Fire & Rescue reviews certificate of compliance. This completes the testing for this period of time.
12. The payment of any required fees is due upon submittal of the preliminary report. The Las Vegas Fire & Rescue may charge for any work associated with the recertification or testing of smoke control systems in accordance with local ordinances.

CERTIFICATE OF COMPLIANCE

Shall utilize the language prescribed in 2003 IBC, Section 909.18.8.3, including the following statement:

"I have reviewed this report and by personal knowledge and on-site observation certify that the smoke-control system is in substantial compliance with the design intent, and to the best of my understanding complies with the requirements of the code."

A sample Certificate of Compliance Tag shall be submitted for review and be approved by the Las Vegas Fire & Rescue.

The Certificate of Compliance Tag shall be attached to the smoke control panel.

APPENDIX A

REFERENCE DOCUMENTS, TO BE USED AS NEEDED

- Applicable Codes
 - Building
 - Fire
 - Mechanical
 - Approved Code Modifications or Variances
- Design Methodology
 - Describe the original design criteria
 - Designate smoke zones using mechanical technology
 - Pressure Differential
 - Exhaust Method
 - Designate smoke zones using passive technology
 - Small scale drawings showing zoning
- Anticipated completion date
- Testing forms
 - Area or equipment covered
 - Acceptability of test results
 - Signature of inspector(s) and date of test
- Testing scenarios
 - Shall be designed to anticipate all potential events
 - Designate whether testing is intrusive or non-intrusive to the normal operations of the facility
 - Fans shall be tested to verify airflow and amperage drain
- Control Diagrams
 - Location of all devices that initiate smoke control
 - Location of all devices involved in the smoke control process (including control dampers, smoke dampers, variable air volume controls, and fans)
 - Identification of all devices provided with standby power
 - Locations of active and passive smoke barriers
 - Smoke control method being used for each smoke zone
 - Capacities of each fan involved in smoke control
- Control Diagrams (continued)

- Sequence of operations (including timing, if necessary to prevent duct implosion or explosion)
- Positioning of each damper for every fire scenario
- Life Safety Report or Fire Protection Report
- Sprinkler System
 - As-built drawings
 - Record of inspections, tests and maintenance
- Fire Alarm System
 - As-built drawings
 - Original Program of Record (showing revision level)
 - Current Program of Record (showing revision level)
 - Print out of comparison report using built-in software
 - Record of inspections, tests and maintenance
 - Diskette of original fire alarm programming
 - Identify applicable maintenance procedures
- As-built Mechanical Drawings
 - Design documents (specifications)
 - Identify applicable maintenance procedures
- As-built Building Automation System Drawings
 - Design documents (specifications)
 - Identify applicable maintenance procedures
- As-built Architectural Drawings
 - Wall ratings
 - Door ratings and hardware schedule
 - Draft curtains
 - Smoke barriers
 - Identify applicable maintenance procedures
- Review Operations and Maintenance Documentation
 - Documentation of changes to system
- Sample Certificate of Compliance
 - Statement
 - Tag

- Final Report
 - Acceptance and resolution for all non-compliance items
 - Typed and bound
 - Minimum of 4 copies
 - One CD containing the report in Adobe Acrobat (PDF) formats.